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(54) Abstract Title
Aroma emitting apparatus

(57) Apparatus for emitting aroma at controllable intervals comprises a sealed chamber 7 containing a reservoir 12 of aromatic material, a valved inlet 4 to the chamber, a valved outlet 6 from the chamber and a fan 2 in a duct 3 leading to the inlet of the chamber, the fan being arranged to force air into and through the chamber. Preferably the inlet and outlet valves open and close in unison in response to operation of the fan. The flaps are preferably biased closed by either being located on a common pivot axis 7 such that the flaps have an offset centre of gravity and/or being provided with spring means for closing the flaps.

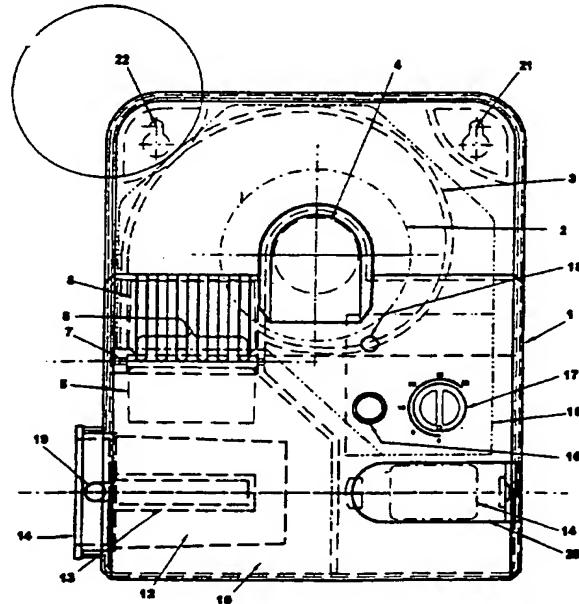
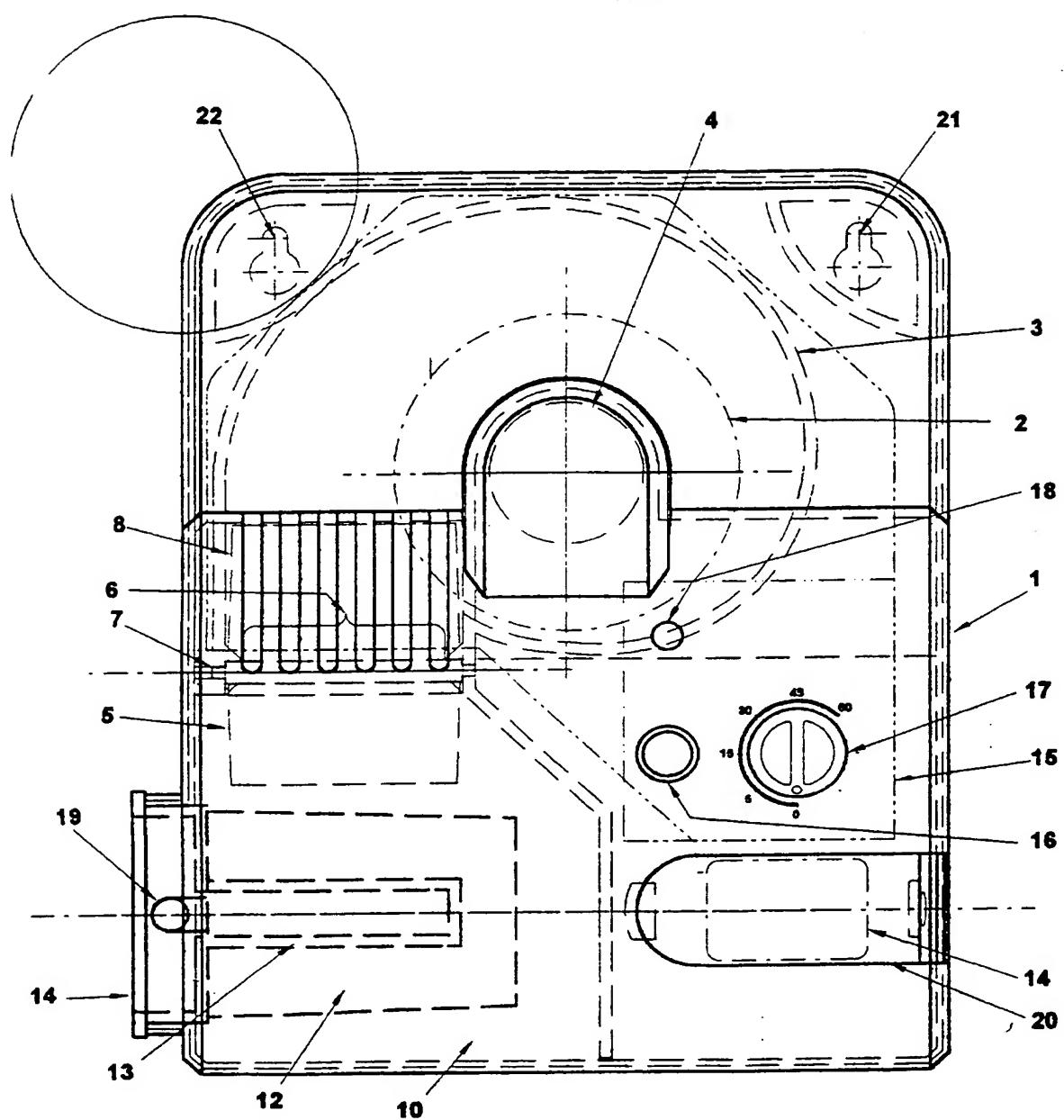


FIG. 1

GB 2322 554 A

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995.

**FIG.1**

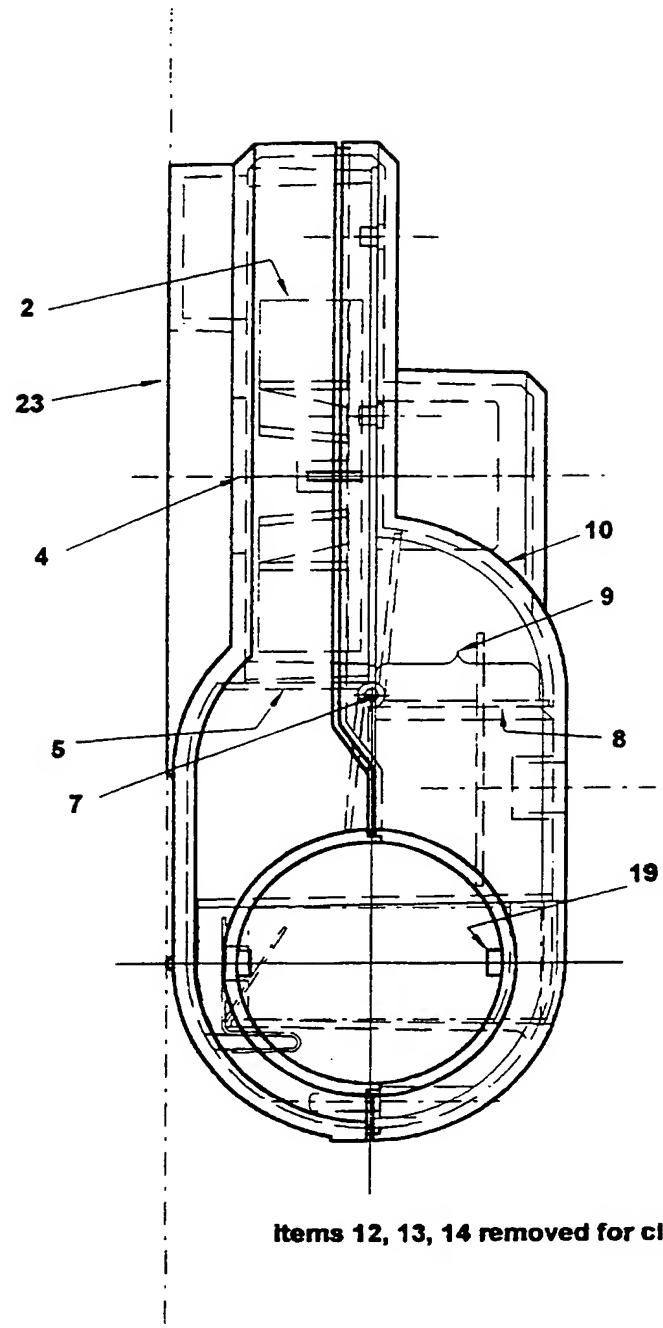


FIG.2

TITLE: APPARATUS FOR PROVIDING AROMA AT CONTROLLED INTERVALS**FIELD:**

This invention relates to apparatus for providing an aromatic smell by release of a perfumed vapour at intervals determined either by elapsed time or the occurrence of an event such as movement of a warm body and to means for preventing release of the aromatic smell until actuated by a control system integral with the apparatus.

BACKGROUND:

Apparatus for emitting aromatic smells are well known and are generally referred to by the misleading title of 'air fresheners' since their function is to mask rather than to remove obnoxious smells. Types of air freshener available can be categorised into three distinct groups depending on the means for generating the aromatic smell. Two of these categories produce aromatic smells by generating an aerosol spray of fine droplets of perfumed liquid, in one case by means of a pressurised aerosol containing liquid perfume and propellant and in the other case by means of a mechanical pump drawing perfumed liquid from a non pressurised reservoir. The third category releases aromatic smell by evaporation of vapour from a reservoir containing perfume in solution or suspension in a volatile medium such as a paste, gel or soap.

Accurate control of the rate of emission of aroma from the first two categories of air freshener can easily be achieved by metering of the aerosol generating means. It is more difficult to control the rate of emission of aroma from the third category of air freshener and most commercially available products of this type have no means of control and emit aroma continuously until the reservoir is exhausted. Some devices in this category employ battery or mains powered fans to provide forced convection over the reservoir of aromatic material.

but no examples are known where the on-off period of the fan is controlled automatically by time interval, or by the occurrence of some external event. In all known examples in the third category, convection still takes place when the fan is switched off, and these devices generally produce an ever present aroma until the reservoir is exhausted.

DESCRIPTION OF THE INVENTION:

It is an objective of the present invention to provide a means of controlling the emission of aroma from air fresheners of the third category, by providing means for positively preventing natural and forced convection from the reservoir of aromatic material until it is actually required, thereby prolonging the active life of the reservoir.

According to a first aspect of the invention, the apparatus according to the invention is provided with a replaceable reservoir of aromatic material located in a sealed chamber within the apparatus. The chamber is provided with inlet and outlet ports and valving means that, when open, permit circulation of air into and out of the chamber with consequent evaporation and emission of aromatic material from the reservoir. When the valving means are closed, circulation of air into and out of the chamber is prevented, and continuous evaporation of the reservoir is prevented by saturation of the relatively small volume of air trapped within the chamber.

According to a second aspect of the invention the said valving means are linked mechanically so that the inlet and outlet ports are opened and closed in unison. In a preferred embodiment, the valving means is a pair of flaps coupled rigidly together and sharing a common axle.

According to a third aspect of the invention, a fan is provided to force air through the inlet valving means. The fan may be powered by either mains or battery electricity, and control means may be provided for controlling the point at which the fan is switched on, and the duration of running.

According to a fourth aspect of the invention the valving means may be operated aerodynamically by operation of the fan. Thus, when the fan is switched on the resulting airflow generates aerodynamic forces on the valving means which causes them to open. When the fan is switched off, the valving means is caused to close by spring or weight generated biasing force.

According to a fifth aspect of the invention control means may be provided to determine the start and duration of fan operation. The said control means may, in its simplest form, be a manually controlled on-off switch, or it may be more sophisticated, with various types of sensor incorporated in electronic circuitry.

In one such embodiment, means are provided for detecting the proximity of a warm blooded animal or human by sensing the movement of an infra red signal, and for engaging the fan after a predetermined delay to run for a pre-determined period. In another embodiment the electronic control system may be basically an interval timer, with provision for the user to alter the time interval between operations of the fan. With the latter type of control system means for inhibiting the operation of the fan when the light level drops below a pre-determined level may also be used to prevent operation of the air freshener at night.

DESCRIPTION OF THE DRAWINGS:

Apparatus according to the invention will now be described by way of example with reference to the accompanying drawings.

Figure 1 is a frontal elevation of an embodiment of the invention

Figure 2 is a side elevation of the embodiment illustrated in figure 1

With reference to figures 1 and 2 the plastic case 1 encloses a fan impeller 2 contained within a volute ducting 3. When the fan is energised to rotate by the control system, air is drawn through an intake orifice 4 in the back of the case and then propelled initially in a radial direction by the fan, and subsequently in a circumferential direction by the fan volute 3 to exhaust through the outlet orifice of the volute at 6 into the chamber 7 within the case 1.

When the fan 2 is stationary, the outlet aperture 6 is closed by flap 5 which pivots on axle 7. The biasing force holding flap 6 closed is provided by a second somewhat heavier flap 8 moulded integrally with the first flap 5 and the pivot 7, and aligned at approximately 180° to the first flap with respect to the axle 7, in which position it seals the outlet orifice 9 of the chamber 10. Grill 11 provides a protective and decorative enclosure within which flap 8 moves.

A reservoir of aroma generating material 12 is mounted on an arbor 13 which is inserted through and sealed with respect to an external wall of the chamber 10. Pins 19 in the neck of the aperture through the external wall help to ensure that the correct proprietary brand of refill is used, since pirate brands, unless specially made for this application, will be balked by interference with the pins.

Various chemical formulations of the aroma generating material are known including gels and soaps mixed with essential oils to give the particular perfume required. In the present embodiment a gel based formulation is particularly suitable and has been found to work well in prototype trials. However it is recognised that almost any aroma generating material could be used for this purpose. It is also recognised that the form of the reservoir is not critical for the successful functioning of the air freshener and almost any concentrated source of perfumed aroma could be used for this purpose, provided that it has a free surface from which to convect. Other possibilities include textile or paper pads soaked in liquid perfume, flasks of liquidation perfume containing a wick that exposes a controlled flow of liquid to the airflow, plastic sponges soaked in perfume etc.

When the fan is operating, air pressure acting on flap 5 causes it to swing open (as illustrated in figure 1 by the dashed line), allowing air to flow into the chamber 10 containing the reservoir of aromatic material. Aroma laden air then escapes from the chamber 10 through aperture 9 and flap 8 and finally emerges to the external environment through the grill 11.

When the fan is not running both the inlet flap 5 and the outlet flap 8 return to their closed positions preventing any convection within the chamber 10. Any further evaporation of aromatic material from the reservoir is then prevented by the saturation of the air within the chamber 10.

Removal and replacement of the reservoir 12 is easily achieved by pulling the cap 14 attached to the arbor 13 so that the residue of aromatic material is withdrawn from the case. Replacement of the reservoir with a new reservoir is achieved by reversal of the above procedure.

Operation of the apparatus may be controlled in a number of ways. The simplest arrangement is for the apparatus to be switched on and off by a manually controlled switch. Various types of automatic control may be provided by electronic circuitry on a printed circuit board 15 mounted within the case of the apparatus. In a first preferred embodiment the electronic circuitry may include proximity sensing means 16 which detect the presence of a warm blooded animal, or other source of infrared radiation and switches the fan on either immediately or after a short controlled time delay. This type of automatic control is ideal for an air freshener located in a toilet environment.

Other types of control involving timers and proximity sensors are also possible and the appropriate electronic circuitry, sensors and user controls may be mounted on the case 1. Figure 1 illustrates an embodiment where the user can set the time interval between operations of the fan by means of the control knob 17. Light sensing diode 18 detects the ambient light level and permits the automatic controller to switch the system off when the light level drops below a certain value.

The electronic control system and fan motor are energised by battery 18 located in a special housing within the case 1, behind a detachable hatch 19.

The apparatus may be surface mounted on worktops, table tops etc, but permanent wall mounting is preferred for most applications. To this end keyhole locations 21, 22 are provided in the back of the case for hooking the apparatus to screws in a wall or door surface. Flange 23 preserves the air gap at the back of the apparatus to facilitate the air intake.

The embodiment described in figures 1 and 2 is a particular arrangement of the features of the invention. Many alternative arrangements are possible within the scope of the invention including the following -

The flaps 5 and 8 may be separate units responding individually to the aerodynamic forces acting separately on them. Alternatively, they may be separate units coupled by mechanical linkage to ensure that they open and close in unison. Another possibility is that the flaps are actuated by mechanical linkage to the fan motor, for example, by harnessing the torque reaction of the motor when it drives the fan.

It is also not essential that the intake and exhaust flaps are disposed at 180° to each other. Any arrangement where they counterbalance each other with a small residual bias towards the closed condition will achieve the required function.

The particular embodiment described in figures 1 and 2 uses a centrifugal fan, which integrates well with the shape of the case. However it is equally possible to use any other type of fan, including axial, or mixed flow types with appropriate ducting and case design.

Similarly, the tapered cylindrical form of the reservoir is particularly suitable for the particular embodiment described. However, the only essential requirement of the design of reservoir and housing is that there should be an exposed surface from which evaporation of perfumed vapour can take place.

Thus, other conceivable forms, include plastic 'yoghurt' type pots containing liquid, paste or gel aromatic material, felt, fabric or paper pad soaked in liquid perfume, flasks of liquid perfume with wicks to meter liquid to a region where it can evaporate, etc.

CLAIMS

1. Apparatus for emitting an aromatic smell of perfumed vapour at controllable intervals comprising a sealed chamber containing a replaceable reservoir of concentrated aromatic material linked via a valved inlet orifice and ducting to an electric fan and by a separate valved outlet orifice and ducting to an outlet port.
2. Apparatus as described in claim 1 in which the valving means in the inlet and outlet ports are linked mechanically so that they operate in unison.
3. Apparatus as described in claims 1 and 2 where the valving means open and close under the influence of aerodynamic and inertia forces so that when the fan is operating aerodynamic forces cause both valving means to open thereby allowing air flow into and out of the sealed chamber and when the fan is stopped inertia forces cause both the valving means to close, thereby sealing the chamber.
4. Apparatus as described in claims 1,2, and 3 where the valving means consist of integrally linked flaps sharing a common pivot axis with an offset center of gravity generating a biasing moment tending to close the flaps.
5. Apparatus as described in claims 1,2,3 and 4 where the biasing force tending to close the flaps is provided by mechanical spring means which may act in conjunction with or instead of the inertia biasing means.

6. Apparatus as described in claims 1,2,3 and 4 in which operation of the electric fan is controlled electronically in response to external influences such as movement of an infra red signal from a warm bodied animal,opening or closing of a door, etc., And in which the fan runs for a fixed time interval once initiated.
7. Apparatus as described in claims 1,2 ,3 and 4 in which operation of the electric fan is controlled on a timed interval basis and in which the fan runs for a fixed time interval once initiated.
8. Apparatus as described in claims 5 and 6 in which a light sensing diode prevents operation of the fan below a settable threshold level of light.
9. Apparatus as described in claim 1 in which the reservoir of aromatic material contains essential oils in suspension or solution in a holding or binding medium.
10. Apparatus as described herein and illustrated in the accompanying drawings.



The
Patent
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10.

Application No: GB 9703919.2
Claims searched: 1-10

Examiner: Gavin Dale
Date of search: 12 May 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A5G (GD, GF, GV)

Int Cl (Ed.6): A61L 9/12

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Ya	GB 2092448A	(VAPORTEK INC.) See Fig 5, page 2 lines 80-86 & line 130 to page 3 line 15	1 at least
Yb	GB 1454040	(KEET) See Fig	1 at least
Yb	WO 96/36056A2	(SC JOHNSON & SON, INC) See Fig 5 & page 9 lines 8-17	1 at least
Yb	US 4968456	(MUDERLAK et al) See Fig 4 & column 2 lines 1-7	1 at least
Yb	US 4695435	(SPECTOR) See Fig 1 & column 2 lines 32-35	1 at least

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Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
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